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"Decay of phonons in Bose gas"

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Abstract: Interacting Bose gas at zero temperature is often described by the Bogoliubov approximation. It involves quasiparticles, called phonons, with a rather curious dispersion relation responsible for superfluidity. The Fermi Golden Rule predicts that the lifetime of phonons is proportional to the 5th inverse power of momentum. This was first computed by Beliaev and goes under the name of the Beliaev damping. I will describe in a mathematically systematic way the chain of steps that leads to the formula for Beliaev damping. Some of these steps can be made rigorous, some of them are only heuristic. Anyway, in my opinion, this is one of the most beautiful computations of theoretical physics.